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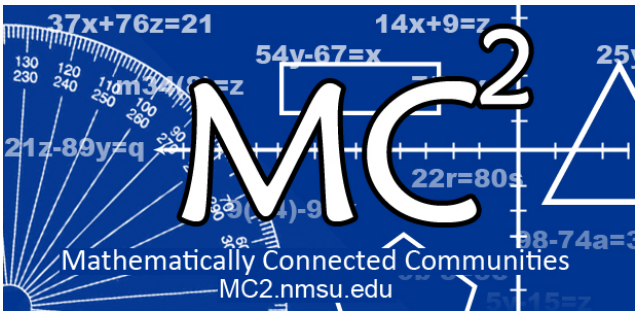
Mathematically
Connected Communities



PARCC Practice Test Items
Algebra I - Mathematics

Excerpted 11/2014 from
PARCC Online Practice Tests
www.parcconline.org

Mathematical Practice Questions for MC^2 Thinking Protocol

Follow the process below in working with the PARCC practice items found in this packet:

1. Choose items from this packet that relate to math concepts studied in the current or previous curriculum units during your math instruction. Each item may be used as a practice item worksheet.
2. Choose a set of **Thinking/Writing Prompts** below based on the math practice the class is working to develop.
3. Add the prompts to the practice item worksheet or display the prompts for the students to respond to.
4. Continue using the same set of prompts for an extended period of time so children develop competence and confidence in describing their mathematical thinking related to the math practice.

The questions below were intentionally not included on each MC^2 PARCC practice item worksheet in this packet. These are intended to help students move beyond "answer getting" to fully making sense of test item questions and their own mathematical thinking.

Thinking/Writing Prompts to Promote Mathematical Practices

Math Practice 1: **Make sense of problems and persevere in solving them.**

1. What do I know about the problem?
2. What questions do I have?
3. Explain your reasoning or thinking in solving the problem.

Math Practice 3: **Construct viable arguments and critique the reasoning of others.**

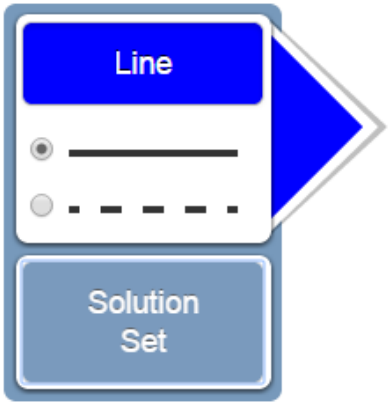
1. What are the assumptions, definitions, and previous knowledge to help in thinking about this problem?
2. What are some possible conjectures that you have about the problem?
3. Explain your mathematical argument so that somebody else can make sense of your thinking.

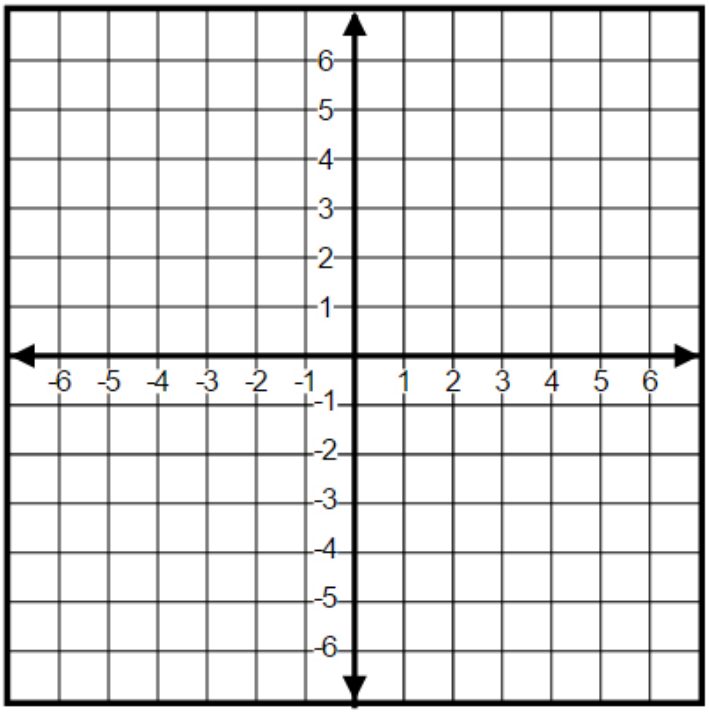
Algebra I PARCC EOY Practice Assessment Item #2 (non-calculator): Standard A-REI.12

Graph the solution set of $2x + y > 6$.

Graph the solution set of the linear inequality in the coordinate plane by

- selecting the "line" button to graph the line and choosing the line style,
- selecting the "solution set" button to select the desired region.





Algebra I PARCC EOY Practice Assessment Item #3 (non-calculator): Standard A-APR.3-1

Determine all zeros for the function $f(x) = (x^2 + 2x - 8)(x - 6)$.

Drag and drop **all** zeros of the function into the box.

−48	−8	−6	−4	−2	0	2	4	6	8	48

Algebra I PARCC EOY Practice Assessment Item #5 (non-calculator): Standard A-Int.1

Consider the equation $(x^2+3)^2+21=10x^2+30$.

Part A

Let $u=x^2+3$. Enter a number into each box such that the resulting equation is equivalent to $(x^2+3)^2+21=10x^2+30$ in terms of u.

Enter your answers in the boxes.

u^2+ ☐ $u+$ ☐ $=0$

Part B

What are the solutions of the equation $(x^2+3)^2+21=10x^2+30$?

Enter your answers in the space provided. You may not need to use all answer boxes.

Algebra I PARCC EOY Practice Assessment Item #6 (non-calculator): Standard F- IF.7a-2

Graph $f(x) = -(x-2)^2 + 4$.

- Select a button to choose the type of graph.
- Drag the two points to the correct positions.

Linear

Absolute Value

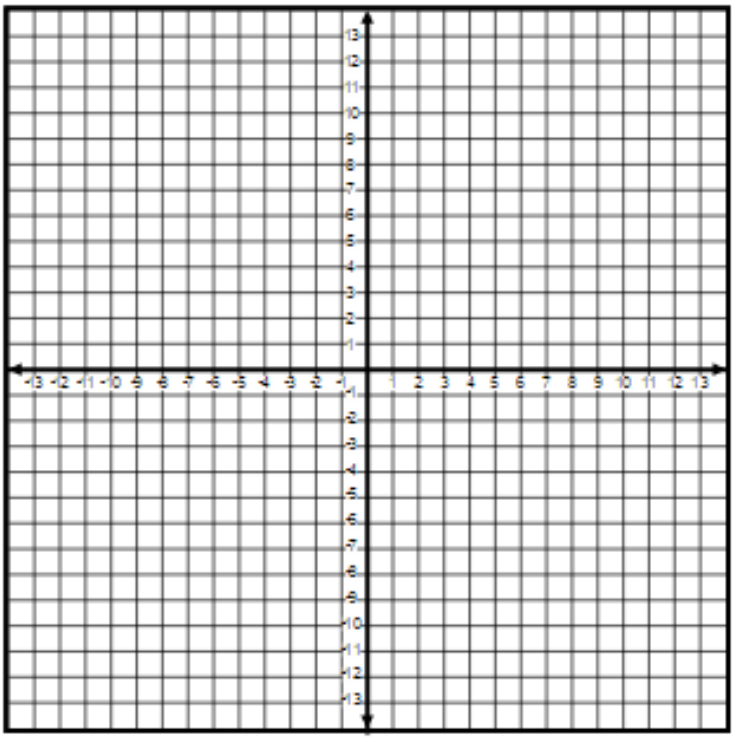
Quadratic

Exponential

Logarithmic

Sin/Cos

Tan/Cotan



Algebra I PARCC EOY Practice Assessment Item #7 (non-calculator): Standard N-RN.B-1

Let a and b be rational numbers and let c be an irrational number.

Part A

Select the appropriate cell in the table to show whether each value is always rational, never rational, or sometimes rational.

Value	$a + b$	$a - b$	c^2
Always Rational	○	○	○
Never Rational	○	○	○
Sometimes Rational	○	○	○

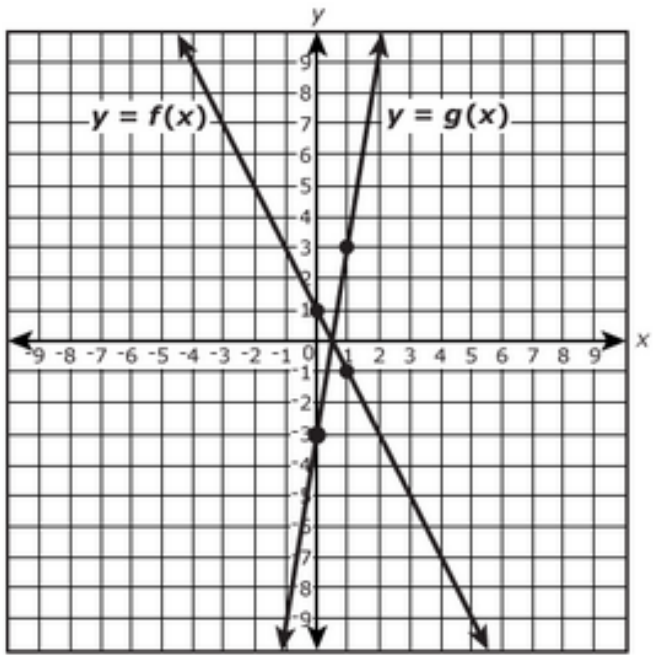
Part B

Consider a quadratic equation with integer coefficients and two distinct zeros. If one zero is irrational, which statement is true about the other zero?

- ○ A. The other zero must be rational.
- ○ B. The other zero must be irrational.
- ○ C. The other zero can be either rational or irrational.
- ○ D. The other zero must be non-real.

Algebra I PARCC EOY Practice Assessment Item #8 (non-calculator): Standard F- BF.3-1

The figure shows the graphs of the functions $y = f(x)$ and $y = g(x)$. The four indicated points all have integer coordinates.



If $g(x) = k \cdot f(x)$, what is the value of k?

Enter your answer in the box.

$k =$ ____

Algebra I PARCC EOY Practice Assessment Item #1 (Calculator Part): Standard A-SSE.1-1

Elephant Population Estimates—Namibia

Combined estimates for Etosha National Park and the Northwestern Population

Year	Base Year	Estimated Number of Elephants
1998	3	3,218
2000	5	3,628
2002	7	3,721
2004	9	3,571

The elephant population in northwestern Namibia and Etosha National Park can be predicted by the expression $2{,}649(1.045)^{b}$, where *b* is the number of years since 1995.

What does the value 2,649 represent?

A. the predicted increase in the number of elephants in the region each year

B. the predicted number of elephants in the region in 1995

C. the year when the elephant population is predicted to stop increasing

D. the percentage the elephant population is predicted to increase each year

Algebra I PARCC EOY Practice Assessment Item #2 (Calculator Part): Standard F-IF.1

Jerome is constructing a table of values that satisfies the definition of a function.

Input	−13	20	0	−4	11	−1	17	
Output	−15	−11	−9	−2	−1	5	5	13

What number(s) can be placed in the empty cell so that the table of values satisfies the definition of a function?

Select **all** that apply.

- ☐ A. -5
- ☐ B. -1
- ☐ C. 0
- ☐ D. 2
- ☐ E. 11
- ☐ F. 17

Algebra I PARCC EOY Practice Assessment Item #3 (Calculator Part): Standard S-ID.5

A random sample of 200 teenagers participated in a taste test. Each teenager sampled four choices of fruit drink (labeled "A", "B", "C", and "D"), and then were asked to pick a favorite. The table shows the results of this taste test.

	A	B	C	D	Total
Boys	45	25	30	20	120
Girls	25	10	30	15	80
Total	70	35	60	35	200

Based on the information given, which of the given statements are true?

Select **all** that apply.

- ☐ A. 40% of the participants were girls.
- ☐ B. 70% of the participants preferred "A".
- ☐ C. $\frac{20}{120}$ of the boys preferred "D".
- ☐ D. $\frac{10}{35}$ of the participants who preferred "B" were girls.
- ☐ E. The proportion of boys who preferred "C" is equal to the proportion of girls who preferred "C".

Algebra I PARCC EOY Practice Assessment Item #4 (Calculator Part): Standard A-SSE.3a

Fill in the missing portions of the function to rewrite $g(x) = 3x^2 - 33x - 180$ to reveal the zeros of the function. What are the zeros of $g(x)$?

Enter your answers in the boxes.

$g(x) = 3(x +$ [ ] $)(x -$ [ ] $)$

Zeros: [ ] and [ ]

Algebra I PARCC EOY Practice Assessment Item #5 (Calculator Part): Standard A-REI. 4b-1

What are the solutions to the equation $\frac{3}{4}x^2 = 48$?

Enter your answers in the space provided. Enter **only** your answers.

$x = \square$ and $x = \square$

- Numbers
- Arithmetic and Units
- Exponents, Roots, Logs
- Relations
- Geometry
- Groups
- Trigonometry
- Statistics
- Greek

Algebra I PARCC EOY Practice Assessment Item #6 (Calculator Part): Standard A-SSE.1-2

A ball was thrown upward into the air. The height, in feet, of the ball above the ground *t* seconds after being thrown can be determined by the expression $-16t^2 + 40t + 3$. What is the meaning of the 3 in the expression? Select the correct answer.

A. The ball takes 3 seconds to reach its maximum height.

B. The ball takes 3 seconds to reach the ground.

C. The ball was thrown from a height of 3 feet.

D. The ball reaches a maximum height of 3 feet.

Algebra I PARCC EOY Practice Assessment Item #7 (Calculator Part): Standard F-IF.5-1

A local theater sells admission tickets for $9.00 on Thursday nights. At capacity, the theater holds 100 customers. The function $M(n) = 9n$ represents the amount of money the theater takes in on Thursday nights, where n is the number of customers. What is the domain of $M(n)$ in this context? Select the correct answer.

- A. all whole numbers
- B. all non-negative rational numbers
- C. all non-negative integers that are multiples of 9
- D. all non-negative integers less than or equal to 100

Algebra I PARCC EOY Practice Assessment Item #8 (Calculator Part): Standard A-CED.4-2

Caroline knows the height and the required volume of a cone-shaped vase she's designing.
Which formula can she use to determine the radius of the vase? Select the correct answer.

- A. $r = \sqrt{\frac{V}{3\pi h}}$
- B. $r = \sqrt{\frac{3V}{\pi h}}$
- C. $r = \frac{\sqrt{3V}}{\pi h}$
- D. $r = \pm\sqrt{\frac{3V}{\pi h}}$

Algebra I PARCC EOY Practice Assessment Item #9 (Calculator Part): Standard A-APR.1-1

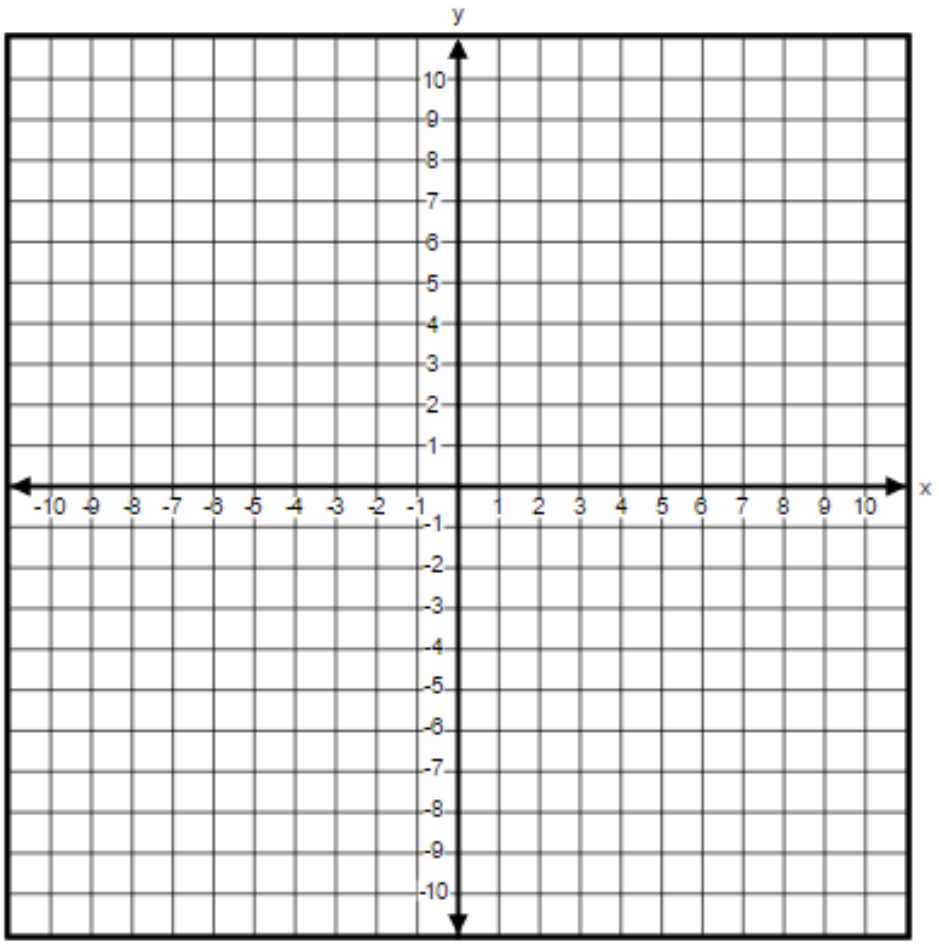
Rewrite the expression $-3a(a+b-5)+4(-2a+2b)+b(a+3b-7)$ to find the coefficients of each term. Enter the coefficients into the appropriate boxes.

$\square\ a^2+\square\ b^2+\square\ ab+\square\ a+\square\ b$

Algebra I PARCC EOY Practice Assessment Item #10 (Calculator Part): Standard A-REI.10

The ordered pairs $(20, -29.5)$, $(21, -31)$ and $(22, -32.5)$ are points on the graph of a linear equation. Graph the line that shows all of the ordered pairs in the solution set of this linear equation.

To graph a line, select two points on the coordinate plane. A line will be drawn through the points.



Algebra I PARCC EOY Practice Assessment Item #11 (Calculator Part): Standard A-REI.11-1b

$$y = x^2 - 2x - 5$$

$$y = x^3 - 2x^2 - 5x - 9$$

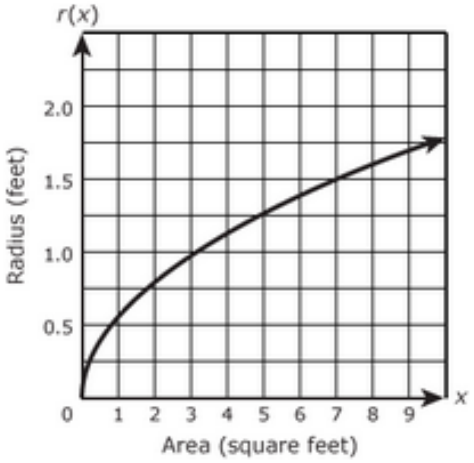
When the solutions to each of the two equations shown are graphed in the *xy*-coordinate plane, the graphs of the solutions intersect at a point. What is the *y*-coordinate of the point of intersection?

Enter your answer in the box.

$y =$ _____

Algebra I PARCC EOY Practice Assessment Item #13 (Calculator Part): Standard F- IF.6-6b

The function $r(x)$ represents the radius of a circle for a given area x. A graph of the function is shown in the figure.



According to the graph what is the approximate average rate of change in the radius of the circle as the area increases from 3 square feet to 7 square feet?

- A. 0.125 foot per square foot
- B. 0.25 foot per square foot
- C. 0.5 foot per square foot
- D. 8 feet per square foot

Algebra I PARCC EOY Practice Assessment Item #14 (Calculator Part): Standard A-SSE.3b

Rewrite the function $f(x) = 2x^2 - 8x + 9$ in vertex form by completing the square.

Enter your answers in the boxes.

$f(x) =$ [ ] $(x -$ [ ] $)^2 +$ [ ]

Therefore, $f(x) = 2x^2 - 8x + 9$ has a minimum value of [ ].

Algebra I PARCC EOY Practice Assessment Item #15 (Calculator Part): Standard A-REI. 4b-2

In the equations listed, *a*, *b*, *c*, and *d* are real numbers. Which of the equations could have solutions that are nonreal?

Select all that apply.

- A. $ax^2 = b$
- B. $ax^2 + bx = 0$
- C. $ax^2 + bx + c = 0$
- D. $(ax + b)(cx + d) = 0$
- E. $a(bx + c)^2 = d$

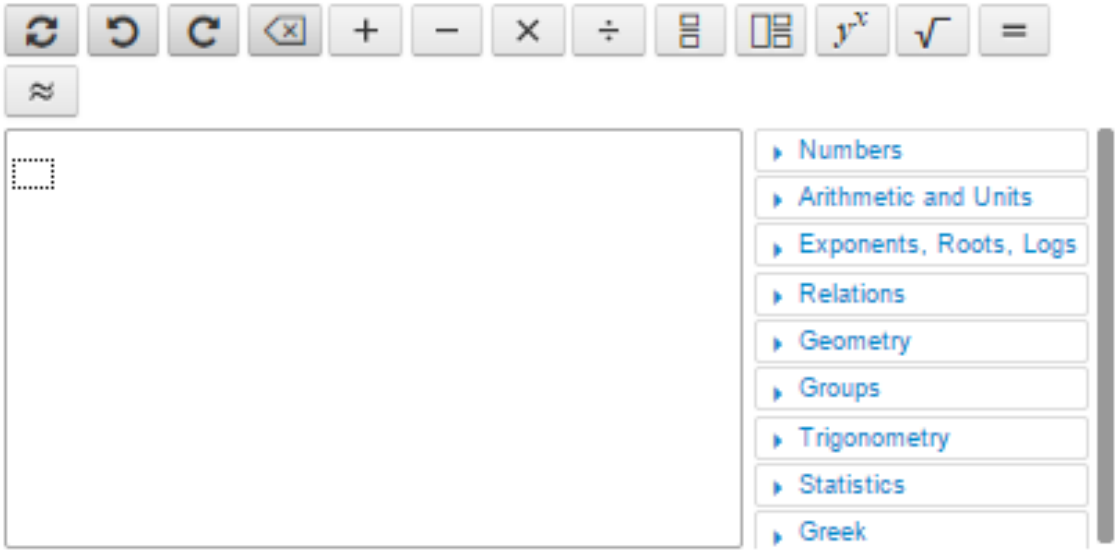
Algebra I PARCC EOY Practice Assessment Item #16 (Calculator Part): Standard A-REI.6-1

In a basketball game, Marlene made 16 field goals. Each of the field goals were worth either 2 points or 3 points, and Marlene scored a total of 39 points from field goals.

Part A

Let x represent the number of two-point field goals and y represent the number of three-point field goals. Write a system of equations in terms of x and y to model the situation.

Enter your answer in the space provided. Enter **only** your system.



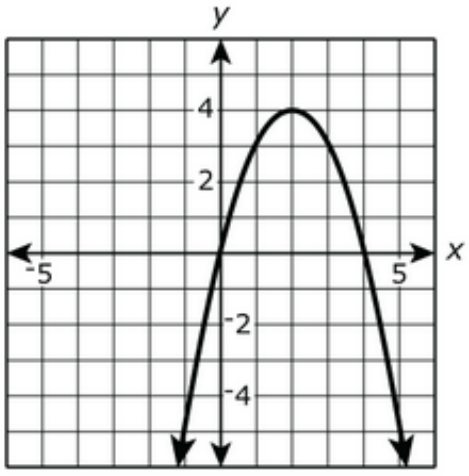
Part B

How many three-point field goals did Marlene make in the game?

Enter your answer in the box.

Algebra I PARCC EOY Practice Assessment Item #19 (Calculator Part): Standard F-IF.4-1

The function $f(x) = 4x - x^2$ is graphed as shown.



Part A

Drag the correct word to the box with each given interval to indicate whether the function is increasing or decreasing on that interval.

Increasing	Decreasing

$x < 0$	$0 < x < 2$	$2 < x < 4$	$x > 4$

Part B

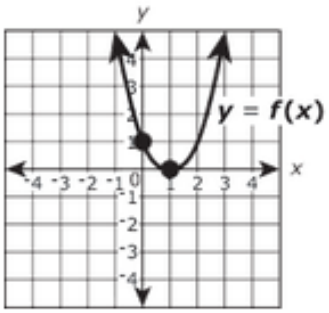
Drag the appropriate value, $f(x) < 0$ or $f(x) > 0$ to the box with each given interval.

$f(x) < 0$	$f(x) > 0$

$x < 0$	$0 < x < 2$	$2 < x < 4$	$x > 4$

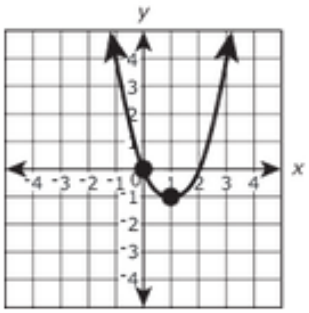
Algebra I PARCC EOY Practice Assessment Item #21 (Calculator Part): Standard F-BF.3-4

Consider the function, $f(x)$, shown on the coordinate plane.



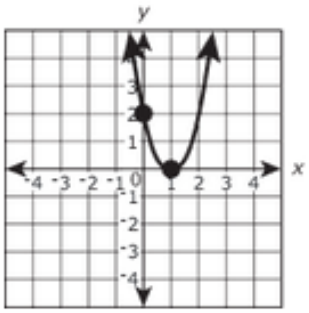
Identify the equations in the form $y = pf(x + r) + n$ which generate each of the graphs shown as a transformation of $f(x)$. Enter a number into each of the available boxes.

Part A



$y =$ ____ $f(x +$ ____ $) +$ ____

Part B



$y =$ ____ $f(x +$ ____ $) +$ ____

Algebra I PARCC EOY Practice Assessment Item #24 (Calculator Part): Standard A- SSE.2-4

Consider the function $f(x) = 2x^2 + 6x - 8$.

Part A

Fill in the missing portions of the equation to rewrite $f(x)$ to reveal the vertex of the graph of the function.

Enter your answers in the boxes. Use decimals if necessary.

$f(x) = 2(x +$ [ ] $)^2 +$ [ ]

Part B

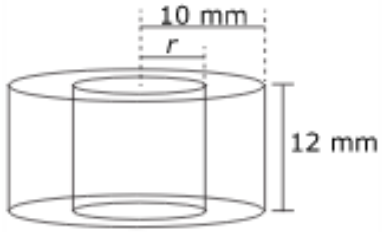
Fill in the missing portions of the equation to rewrite $f(x)$ to reveal the zeros of the function.

Enter your answers in the boxes. Use decimals if necessary.

$f(x) = 2(x +$ [ ] $)(x +$ [ ] $)$

Algebra I PARCC EOY Practice Assessment Item #26 (Calculator Part): Standard F-Int.1-1

The diagram shows two cylinders with bases that have the same center and heights of 12 millimeters.



Part A

Which is a function for the volume, *V*, that is inside the larger cylinder but outside the one with the smaller radius *r*?

- A. $V(r) = 1,200\pi - 12\pi r^2$
- B. $V(r) = 120\pi - 12\pi r^2$
- C. $V(r) = 12\pi r^2$
- D. $V(r) = 12\pi(10 - r)^2$

Part B

Suppose that there is space between the inner and outer cylinders and the radius of the inner cylinder must be an integer greater than or equal to 3. What is the domain of *V*?

- A. all integers greater than or equal to 3
- B. 3, 4, 5, 6, 7, 8, 9, or 10
- C. 3, 4, 5, 6, 7, 8, or 9
- D. $3 \leq m \leq 9$

Algebra I PARCC EOY Practice Assessment Item #27 (Calculator Part): Standard HS-Int.2

The function *f* is defined by $f(x) = x^2 - 2x - 24$.

Part A

If $f(x+3) = x^2 + kx - 21$, what is the value of *k* ?

Enter your answer in the box.

Part B

What are the zero(s) of $f(x+3)$?

Select all that apply.

- A. $x = -7$
- B. $x = -4$
- C. $x = -2$
- D. $x = 0$
- E. $x = 3$
- F. $x = 6$